L 62576-65
ACCESSION NR: AP5019261

2

were used as measuring hoppers for salt, carbamide, and chalk. The fodder was

[illegible] Kazakhskiy nauchno-issledovatel'skiy institut mekhanizatsii i

Card 2/2

PENKIN, M. A.

1083* Apparatus for Determination of Eccentricity and Thickness of Electrode Coatings for Arc Welding. (In Russian). M. A. Penkin. Avtogennoe Delo (Welding), v. 21, Sept. 1950, p. 18-20.

Describes above, characterized by extreme simplicity and accuracy of measurement up to 0.03 mm. The device is based on the principle of the inductive collector and is designed as an unbalanced a.c. bridge. Electrical circuit is illustrated schematically.

Immediate source clipping

PENKIN, M. A., Engr

PA 167T78

USSR/Metals - Welding Equipment Sep 50

"Device for Determination of the Eccentricity and Thickness of Coating on Electrodes for Electric Arc Welding," M. A. Penkin, Engr, Lab of Elec Welding, VISKhOM

"Avtogen Delo" No 9, pp 18-20

Instrument constructed in 1949 in welding lab, All-Union Inst of Agr Mach Bldg for nondestructive measuring of eccentricity and thickness of coating. Method based on use of induction gauge; accuracy is 0.03 mm. Instrument simple and dependable; for inspection of electrodes in mass production.

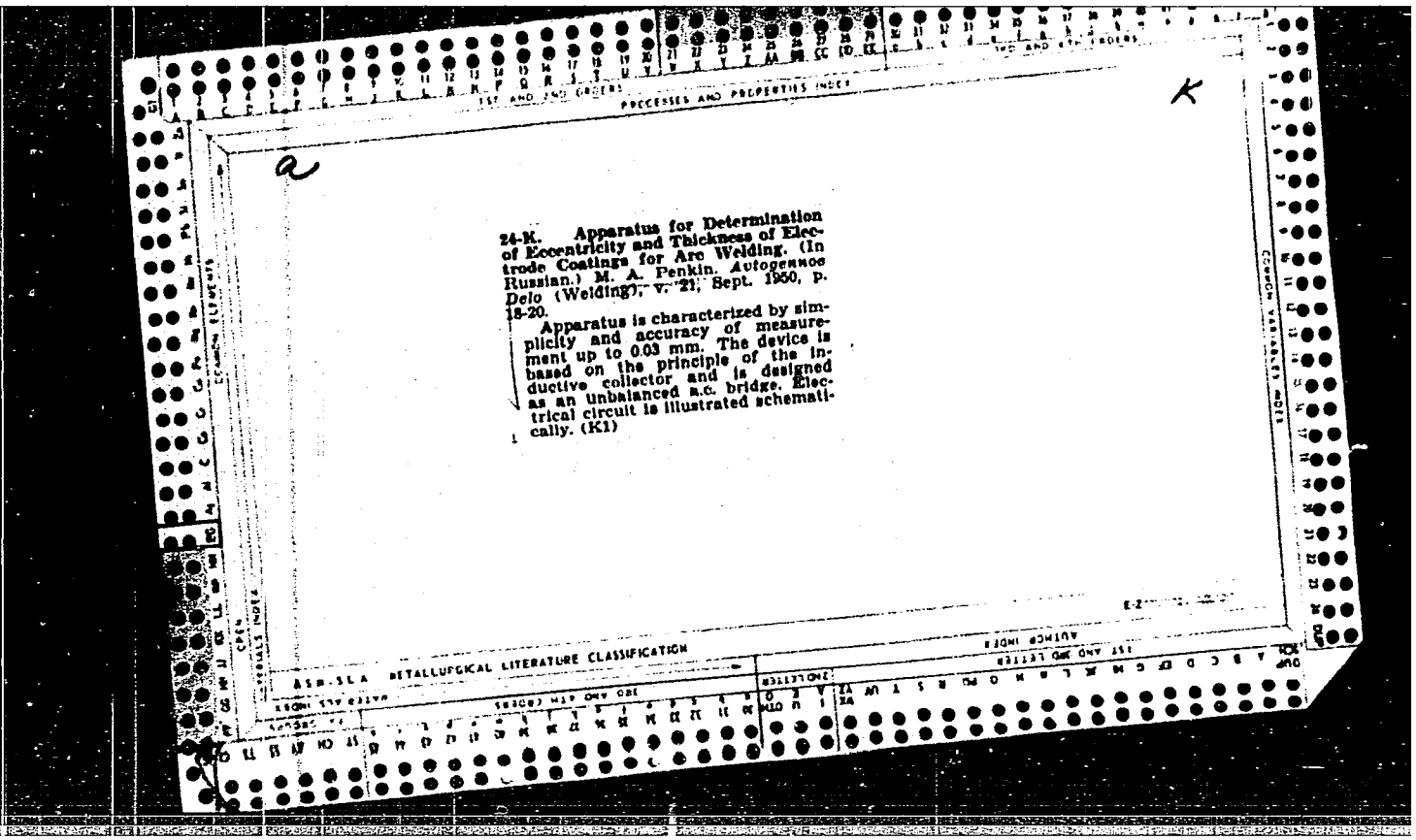
FDD 167T78

PENKIN, M. A.

1088* Apparatus for Determination of Eccentricity and Thickness of Electrode Coatings for Arc Welding. (In Russian). M. A. Penkin. Avtogennoe Delo (Welding), v. 21, Sept. 1950, p. 18-20.

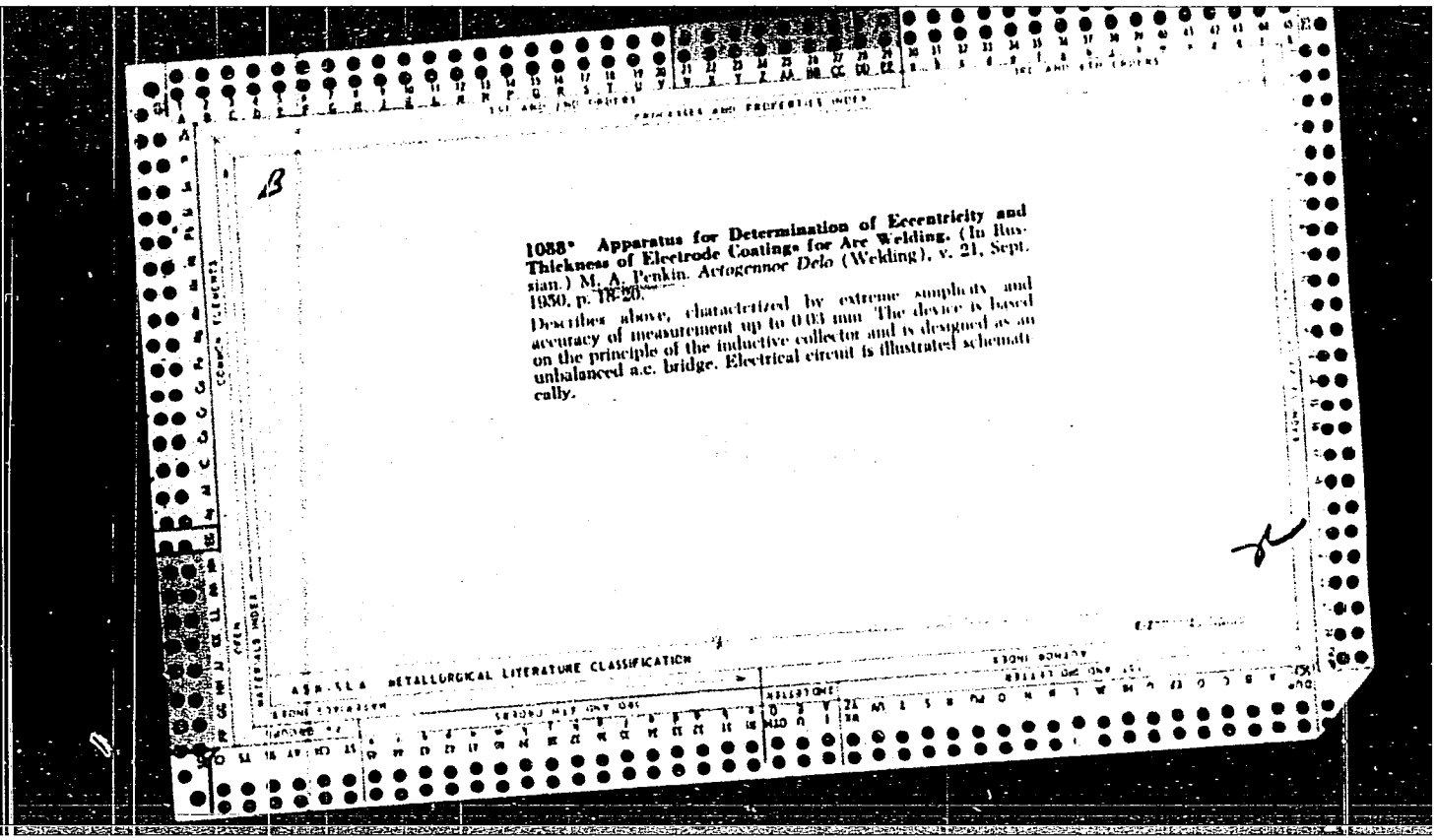
Describes above, characterized by extreme simplicity and accuracy of measurement up to 0.03 mm. The device is based on the principle of the inductive collector and is designed as an unbalanced a.c. bridge. Electrical circuit is illustrated schematically.

Immediate source clipping



24-K. Apparatus for Determination of Eccentricity and Thickness of Electrode Coatings for Arc Welding. (In Russian.) M. A. Penkin. *Avtogennoe Delo* (Welding), v. 21, Sept. 1950, p. 18-20.

Apparatus is characterized by simplicity and accuracy of measurement up to 0.03 mm. The device is based on the principle of the inductive collector and is designed as an unbalanced a.c. bridge. Electrical circuit is illustrated schematically. (K1)



1088* **Apparatus for Determination of Eccentricity and Thickness of Electrode Coatings for Arc Welding.** (In Russian.) M. A. Penkin. *Avtogennoe Delo* (Welding), v. 21, Sept. 1950, p. 18-20.

Describes above, characterized by extreme simplicity and accuracy of measurement up to 0.03 mm. The device is based on the principle of the inductive collector and is designed as an unbalanced a.c. bridge. Electrical circuit is illustrated schematically.

MIKHAIL ALEKSEYEVICH PENKIN

723.1
.P9

Mekhanizatsiya I Elektrifikatsiya Sel'skogo Khozyaystva (Mechanication and Electrification in Agriculture, By) ARDALION FEDOKOVICH PRONIN I Mikhail Alekseyevich Penkin. Moskva, Sel'khozgiz, 1955.

550 P. Illus., Diagrs., Tables.

At Head of Title: Uchebniki I Uchebnyye Posobiya Dlya Sel'skokhozyaystvennykh Tekhnikumov.

PENKIN, M., inzh.

Cooling and lubricating systems of engines. Tekh.v sel'khoz. 19 no.5:40-42 My '59. (MIRA 12:7)

1. Moskovskaya sel'skokhozyaystvennya akademiya im. K.A.Timiryazeva. (Tractors--Lubrication) (Tractors--Engines--Cooling)

Penkin, Mikhail Alekseyevich

PRONIN, Ardalion Fedorovich; PENKIN, Mikhail Alekseyevich; GAVRILOV, F.P., redaktor; PAVLOVA, M.M., tekhnicheskiy redaktor.

[Mechanization and electrification of agriculture] Mekhanizatsiia i elektrifikatsiia sel'skogo khoziaistva. Moskva, Gos. izd-vo selkhoz. lit-ry, 1955. 550 p. (Uchebniki i uchebnye posobiia dlia sel'skokhoziaistvennykh tekhnikumov). (MLRA 9:4)
(Electricity in agriculture) (Agricultural machinery)

PENKIN, M.G., Cand Tech Sci — (diss) "Effect of the mountainous relief of fields of Vostochno-Kazakhstanskaya Oblast upon the wear of the DT-54 tractor." Len, 1959, 17 pp (Min of Agr RSFSR. Len Agr Inst) 120 copies (KL, 34-59, 114)

PENKIN, N.

Remote control of the starting of main engines on Czechoslovak-built 43B-350 dredging machines. Rech.transp 21 no.4:40-41 Ap '62. (MIRA 15:4)

1. Zamestitel' nachal'nika Muromskogo tekhnicheskogo uchastka Upravleniya kanala imeni Moskvy.
(Dredging machinery) (Remote control)

PENKIN, N.

The school radio club. Prof.-tekh.obr. 12 no.1:24 J '55.
(Kirov Province--Radio clubs) (MLRA 8:3)

ZHIL'TSOV, Petr Nikolayevich, inzh.; KOLYADA, Grigoriy Ivanovich, inzh.; PENKIN, N.F., kand.tekhn.nauk, red.; MARENKOVA, G.I., inzh., red.; BOBROVA, Ye.N., tekhn.red.

[Manual for electricians of dispatcher controlled signal systems] Rukovodstvo elektromekhaniku i monteru dispetcherskoi tsentralizatsii. Moskva, Gos.transp.zhel-dor.izd-vo, 1959. 282 p. (MIRA 12:12)

(Railroads--Electric equipment)

PENKIN, N.F.; PIROZHKOV, F.V., inzh., retsenzent; MARENKOVA, G.I., inzh., red.; KHITROVA, N.A., tekhn. red.

[Centralized traffic control] Dispetcherskaia tsentralizatsiia. Moskva, Transzheldorizdat, 1963. 359 p. (MIRA 17:1)

PENKIN, N.F., kandidat tekhnicheskikh nauk.

[Alternating-current railroad circuits with choking transformers] Rel'sovye tsepi peremennogo toka s drossel'-transformatorami. Moskva, Gos. transp. zhel-dor. izd-vo, 1953. 143 p. (Trudy Vsesoiuznogo nauchno-issledovatel'skogo instituta zheleznodorozhnogo transporta, no.83) (MLRA 7:4)

(Electric railroads)

PENKIN, N. F.

"Dispatcher Centralization in Railway Transportation"(Dispetcherskaya tsentralizatsiya na zheleznodorozhnom transporte) from the book Telemechanization in the National Economy, pp. 362-371, Iz. AN SSSR, Moscow, 1956

(Given at meeting held in Moscow 29 Nov to 4 Dec 54 by Inst. of Automatics and Telemechanics)

PEMKIN, N.F., kandidat tekhnicheskikh nauk.

Using semiconductors in railroad electronic equipment. Zhel.dor. transp. 37 no.5:65-69 My '56. (MLRA 9:8)
(Semiconductors)
(Railroads--Electronic equipment)

PENKIN, N. F.

"Polarity-Frequency Dispatcher Centralization," by N. F. Penkin, Avtomatika, Telemekhanika i Svyaz', No 1, Jan 57, pp 13-18

A new centralized dispatcher system on railroads, called polarity-frequency system (PChDTs) has been developed, in which the control and information signals are transmitted by pulses of equal duration, but of different polarity.

The new system eliminates slow-acting relays and thus considerably simplifies the whole dispatcher system. The time for the transmission of the control command is 2.5 sec and about 1 sec for the information. The capacity of the PChDTs system is 640 control and 1,280 regulating two-position objectives.

A detailed description of the principle of operation of the polarity-frequency dispatcher system is given.

SUM, 1267

PENKIN, N., aspirant; ARISTOV, Yu.

Increasing the durability of components of dredging pumps. Rech. transp. 23 no.11:33-35 N '64. (MIRA 18:3)

1. Leningradskiy institut vodnogo transporta (for Penkin).
2. Zamestitel' nachal'nika Upravleniya kanala imeni Moskvy (for Aristov).

BRYLEYEV, Arkadiy Mikhaylovich, doktor tekhn. nauk, prof.; PENKIN, Nikolay Fedorovich, kand. tekhn. nauk; PUGIN, Daniil Kalistratovich, kand. tekhn. nauk; SHARIKOV, Vladimir Alekseyevich, inzh. Prinimal uchastiye DMITRENKO, I.Ye., inzh.; SHIROKSHIN, K.A., inzh., retsenzent; MARENKOVA, G.I., inzh., red.; NOVIKAS, M.N., inzh., red. USENKO, L.A., tekhn. red.

[Transistorized and magnetic noncontact devices of centralized traffic control systems] Poluprovodnikovye i magnitnye beskontaktnye pribory v ustroistvakh STsB. [By] A.M.Bryleev i dr. Moskva, Transzheldorizdat, 1962. 230 p. (MIRA 15:5)
(Railroads--Electronic equipment)
(Railroads--Signaling--Centralized traffic control)

YEGORENKOV, N.G., inzh.; KARVATSKIY, S.B., inzh.; PENKIN, N.F., kand.tekhn. nauk; SOBOLEV, V.Ya., kand.tekhn.nauk; TERPUGOV, G.A., inzh.; PETUSHKOVA, I.K., inzh.,red.; BOBROVA, Ye.N., tekhn.red.

[ChDTs-TsNII system frequency-operated centralized traffic control] Chastotnaia dispetcherskaia tsentralizatsiia sistemy ChDTs-TsNII. Moskva, Vses. izdatel'sko-poligr. ob"edinenie M-va putei soobshcheniia, 1961. 174 p. (Moscow. Moskovskii institut inzhenerov zheleznodorozhnogo transporta. Trudy, no.210.) (MIRA 14:7)
(Railroads--Signaling--Centralized traffic control)

KOTLYARENKO, Nikolay Fedorovich; VOLKOV, V.F., inzh., starshiy prepodavatel', retsenzent; LEONOV, A.A., inzh., retsenzent; SHISHLYAKOV, A.V., kand. tekhn. nauk, retsenzent; PENKIN, N.F., kand. tekhn. nauk, nauchnyy red.; BOBROVA, Ye.N., tekhn. red.

[Electric rail circuits] Elektricheskie rel'sovye tsepi. Moskva, Vses. izdatel'sko-poligr. ob"edinenie M-va putei soobshcheniia, 1961. 326 p. (MIRA 14:8)
(Railroads—Signaling)

PENKIN, N.F., kand.tekhn.nauk

New CTC frequency systems. Vest.TSNII MPS 18 no.8:3-9 D '59. (MIRA 13:9)

(Railroads--Automatic train control)

PENKIN, N.F., kand. tekhn. nauk

Automatic train control. Zhel. dor. transp. 41 no.10:37-40 O '59.
(MIRA 13:2)
(Railroads--Automatic train control)

SOV/112-59-5-9686

32(3), 9(0)

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 5 pp 176-177 (USSR)

AUTHOR: Penkin, N. E.

TITLE: Application of Electronics in Track Circuits

PERIODICAL: Vestn. Vses. n.-i. in-ta zh.-d. transp., 1958, Nr 3, pp 8-14

ABSTRACT: Application of electronics to track circuits permits abandoning rotating-machine converter substations and high-voltage signal-frequency lines; local low-power electronic frequency converters supplied by contact-wire 50-cps current are used; new types of station double-rail switch track circuits have been developed. They permit superposing the codes of automatic cab signaling, which secures the control of locking the insulated rail joints of the adjacent track circuit; they replace the track circuits with a two-element track relay. Tone-frequency electronic track circuits (300, 850, 1,500, and 2,000 cps) have been used on the railroads in France electrified with 50-cps power

Card 1/2

Application of Electronics in Track Circuits

supply. In the USSR, where continuous automatic cab signaling with speed control is being widely adopted (nonexistent in France), reliable and noise-free operation of the system must be made the basis of selection of signal-current frequency. Determining the minimum permissible signal current in the rails and the power consumed by track circuits must be made with due consideration to the noise level around the signal-current frequency. Two types of noise should be discerned: (1) traction-current sinusoidal harmonics that have sustained frequency and amplitude and (2) a continuous-spectrum noise due to traction-current transients. Noise and anti-noise measures are examined in detail. Using tone frequencies for track circuits opens wide possibilities for cutting the track-circuit consumption and improving the noise-proof automatic cab signaling. Four illustrations.

T.I.L.

PENKIN, N. (F.), kand.tekhn.nauk

Prospects for the further development of dispatcher interlocking. Zhel.dor.transp. 36 no.6:14-19 Je '55. (MIRA 12:4)
(Railroads--Train dispatching) (Railroads--Signaling)

32 (3)

SOV/112-57-5-10946

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 5, p 198 (USSR)

AUTHOR: Vakhnin, M. I., Penkin, N. F., Pokrovskiy, M. A., Pugin, D K., Talykov, A. A.

TITLE: Railroad Signaling Equipment with AC Traction System (Ustroystvo STsB pri elektricheskoy tyage peremennogo toka)

PERIODICAL: Tr. Vses. n.-i. in-ta inzh. zh.-d. transpr., 1956, Nr 126, p 220, ill.

ABSTRACT: Bibliographic entry.

Card 1/1

PENKIN, N.F.

Polar-frequency system of central dispatching. Biul.tekh.-ekon.inform. no.1:69-71 '59. (MIRA 12:2)
(Railroads--Signaling)

SOV/19-58-6-150/685

AUTHORS: Penkin, N. F., Sobolev, V. Ya., and Kut'in, I. M.

TITLE: A Method of and Device for Code Two-Wire Frequency Centralized Dispatcher's Control
(Sposov kodovoy dvukhprovodnoy chastotnoy dispetcherskoy tsentralizatsii i ustroystvo dlya osushchestvleniya sposoba)

PERIODICAL: Byulleten' izobreteniy, 1958, Nr 6, p 37 (USSR)

ABSTRACT: Class 21a^3, 49. Nr 113314 (562306 of 6 Dec 1956). Dependant on Author's Certificate Nr. 100471. Submitted to the Committee for Inventions and Discoveries at the Ministers Council of USSR. A method as specified in title, with the selection of the command transmission sequence as well as the transmission of controlling and indication signals effected with the frequency code specified in Author's Certificate Nr 100471; positive and negative direct current is fed into the line circuit in order to simplify the filters and use the same frequencies and the same generators for transmitting and receiving. The arrangement for forming code pulses includes relay-counters of the relay distributor and a polarized pulse relay with two windings operating in

Card 1/2

A Method of and Device for Code Two-Wire Frequency Centralized Dispatcher's Control

turn; with the duration of command pulses controlled by a choke.

Card 2/2

PENKIN, N.F., kand.tekhn.nauk.

PChDTs-56 apparatus for centralized dispatching. Avtom., telem. i sviaz' 2 no.10:6-11 O '58. (MIRA 11:10)
(Railroads--Train dispatching--Equipment and supplies)

BRYLEYEV, A.M.; FONAREV, N.M.; SHISHLYAKOV, A.V.; PENKIN, N.F.; ARSHAVSKIY, S.L.; SADOV, I.Ya., red.; VERINA, G.P., tekhn. red.

[Automatic locomotive signaling with continuous automatic stop according to the system developed by the Central Scientific Research Institute] Avtomaticheskaia lokomotivnaia signalizatsiia s nepreryvnym avtostopom sistemy TSNII. Moskva. Gos. transp. zheldor. izd-vo, 1952, 190 p. (Moscow. Vsesoiuznyi nauchno-issledovatel'skii institut zheleznodorozhnogo transporta. Trudy, no.52). (MIRA 11:6)

(Railroads--Signaling)
(Railroads--Automatic train control)

PENKIN, N.F., kand.tekhn. nauk

Using electronics in rail circuits. Vest. TSNII MPS [17] no.3:8-14 My '58. (MIRA 11:6)
(Electric railroads--Electronic equipment)

PENKIN, N.F.

112-3-6643

Translation from: Referativnyy Zhurnal, Elektrotekhnika, 1957, Nr 3, p. 220 (USSR)

AUTHOR: Penkin, N.F.

TITLE: Centralized Traffic Control in Railroad Transportation (Dispetcherskaya tsentralizatsiya na zheleznodorozhnom transporte)

PERIODICAL: In sbornik: Telemekhaniz. v nar. kh-ve, Moscow, AN, 1956, pp. 362-371

ABSTRACT: The stages in the development of railroad centralized traffic control (CTC) are discussed: selector communication with selective ringing, the introduction of automatic blocking and centralized control at intermediate stations, the use of centralized control devices, and, finally, the adoption of CTC since 1936. As a result

Card 1/3

Centralized Traffic Control in Railroad Transportation (Cont.)

of using CTC on single track sections of roads with an electric block system and manual switch lever control, traffic capacity increased by 25-30%, and running speed by 20-25%. CTC insures train safety and makes possible a reduction in the number of traffic control workers by 30-40%, while enabling more efficient use of locomotives, cars and train teams. CTC pays for itself after 5 to 7 years of operation. Included is a discussion of improving the reliability of line circuits by connecting line supervisory relays in parallel instead of in series and to code transmission by shunting the line instead of by breaking the line circuit. The construction of codes for CTC systems employing temporary codes is shown, and the advantage of point-to-point control is indicated. CTC makes it possible to eliminate numerical protection if the line circuit and apparatus are properly maintained. However, numerical protection is still required in circuit shunting transmission of pilot codes. The wide use of polarized relays and the adoption of plug-type code relays are noted. It is pointed out that the major shortcomings of temporary code systems have not been eliminated, and there is little possibility of further improving these systems. There is

Centralized Traffic Control in Railroad Transportation (Cont.)

a need for increasing the rapid response of CTC on single track sections, where second tracks must be built in the near future or where non-stop turnout of trains is being adopted, and also for the use of CTC on two track road sections with heavy traffic. It is advantageous to utilize the frequency principle for transmission of pilot codes, and the polarity principle for the controlling codes. Included in a diagram of a line circuit and receiving device of a CTC polarity frequency system known as the ЧДЧ. The principles are presented for a system of transmitting control codes by means of continuous alternating current frequency-modulated over a band of 1,650 - 2,550 cps. The frequencies of 1,650, 1,950, 2,250, and 2,550 cps are used in the new ЧДЧ control code transmission system; the direction of deviation from the average frequency of 2,100 cps serves to operate a counting circuit, and the magnitude of deviation determines the code elements. The receiving device and frequency generator of the ЧДЧ system are briefly described. The next problem is replacement of the electron tubes by semiconductor triodes. N.M.F.

Card 3/3

Penkin, N.F.

VAKHNIN, M.I.; POKROVSKIY, M.A.; TALYKOV, A.A.; PENKIN, N.F.; PUTIN, D.K.
VAKHNIN, M.I., professor, doktor tekhnicheskikh nauk, redaktor;
GERONIMUS, B.Ye., kandidat tekhnicheskikh nauk, redaktor; KHITROV,
P.A., tekhnicheskiy redaktor.

[Signaling, central control and block system for use with d.c. electric traction] Ustroistva STsB pri electricheskoi tiage peremennogo toka. Moskva, Gos.transp.zhel.-dor.izd-vo, 1956. 219 p. (Moscow. Vsesoiuznyi nauchno-issledovatel'skii institut zheleznodorozhnogo transporta. Trudy, no.126). (MLRA 10:1)

(Electric railroads--Signaling)

PENKIN, N.F., kandidat tekhnicheskikh nauk.

Polar-frequency centralized dispatching. Avtom., telem. i sviaz' no.2: 11-17 F '57. (MLRA 10:4)

(Railroads--Train dispatching)

PENKIN, N.F., kandidat tekhnicheskikh nauk

New polarity-frequency system of centralized dispatching. Vest. TSNII MPS no.1:3-13 F '57. (MLRA 10:3)
(Railroads--Train dispatching)

PENKIN, N.F., kandidat tekhnicheskikh nauk.

Polar-frequency centralized dispatching. Avtom., telem. i sviaz' no.1: 13-18 Ja '57. (MLRA 10:4)

(Railroads—Train dispatching)

PENKIN, N.F.

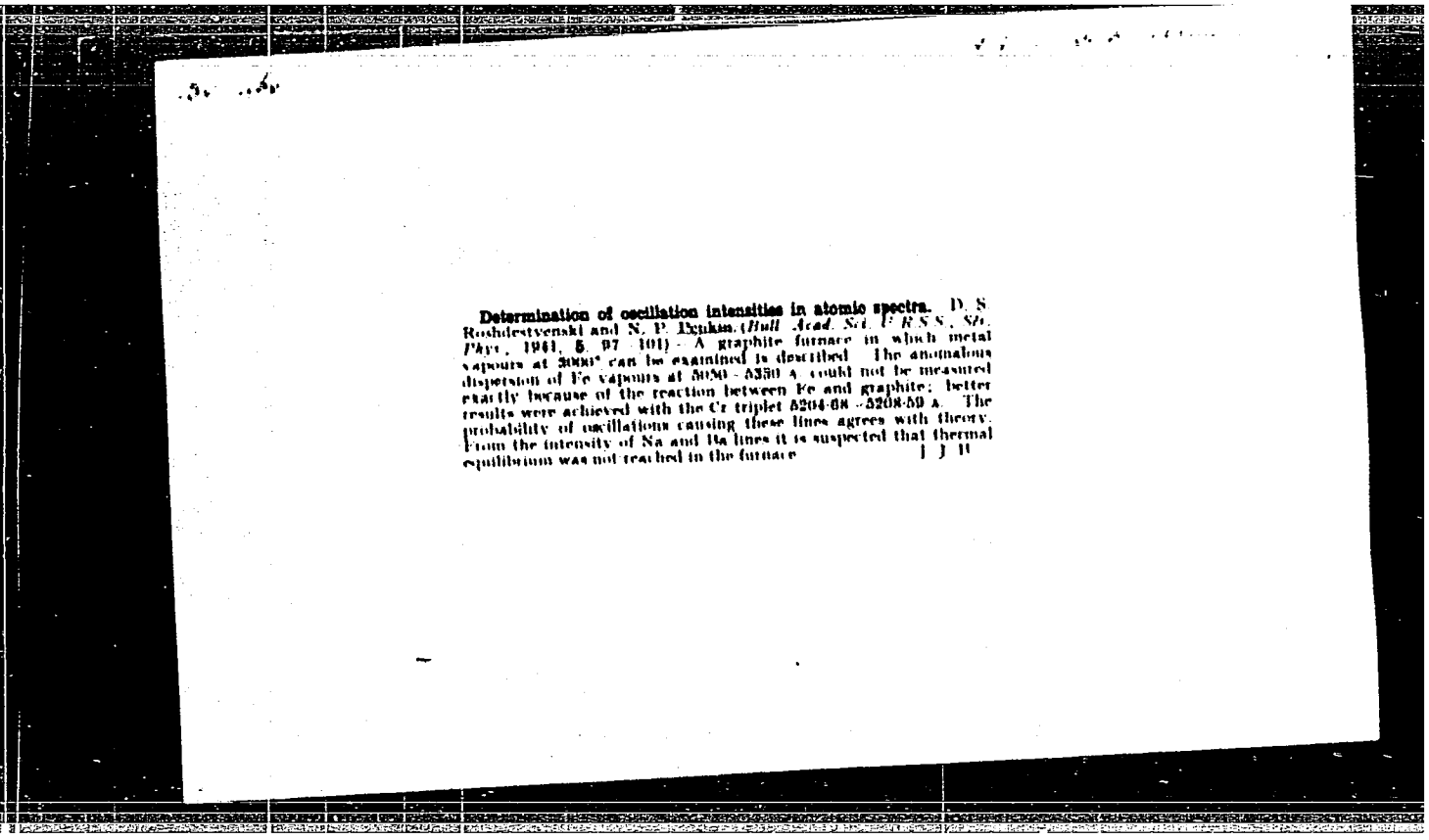
KUT'IN, I.M., kandidat tekhnicheskikh nauk; PENKIN, N.F., kandidat tekhnicheskikh nauk.

New centralized dispatcher system. Vest.TSNII MPS 15 no.2:60 S '56. (MLRA 9:12)
(Railroads--Signaling)

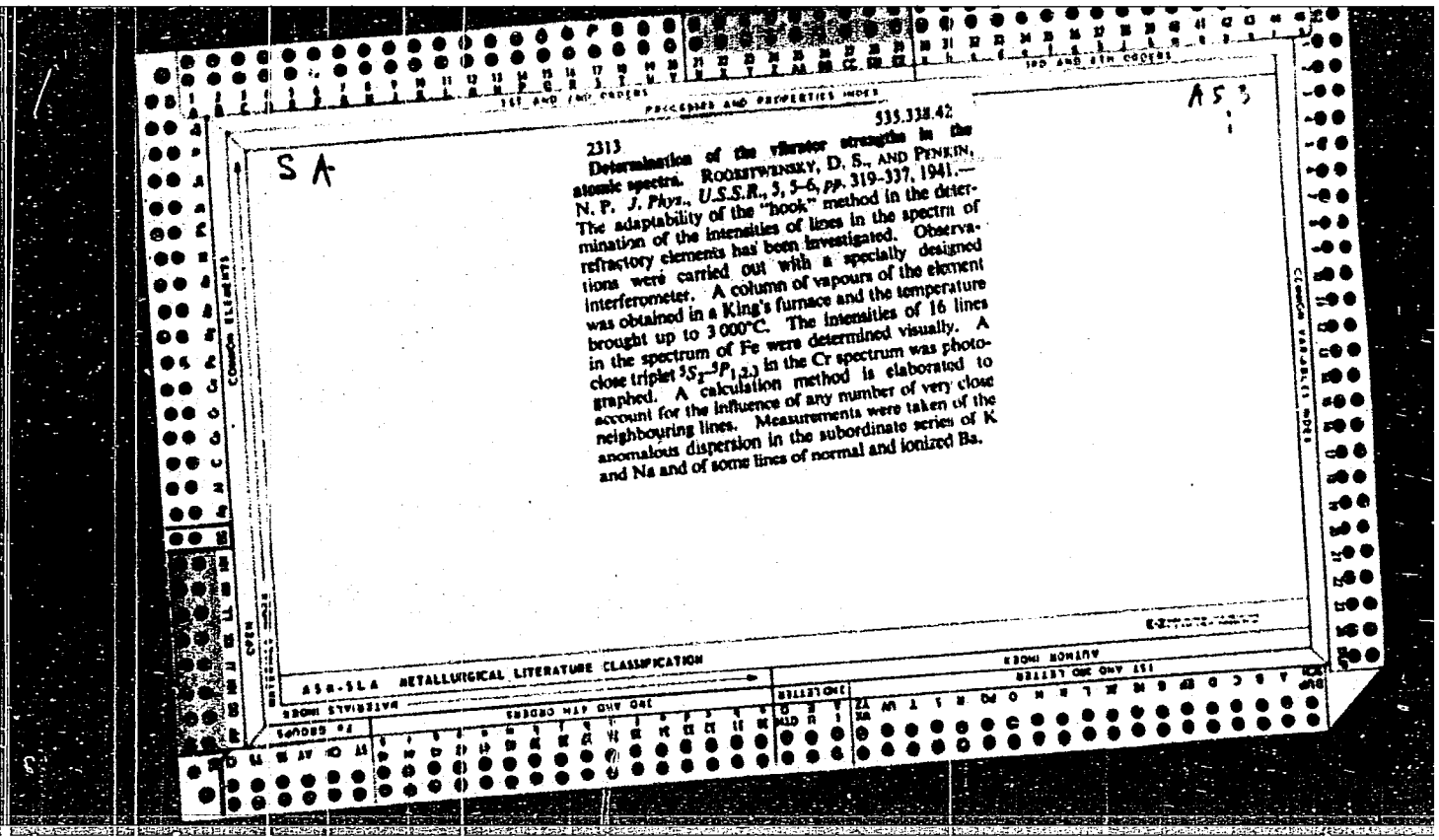
PENKIN, N.F.; MARENKOVA, G.I., red.; BOBROVA, Ye.N., tekhn.red

[Telemechanical communication channels for centralized traffic control] Telemekhanicheskie kanaly sviazi dispetcherskoi tsentralizatsii. Moskva, Gos.transp.zhel-dor.izd-vo, 1959. 118 p. (Moscow. Vsesoiuznyi nauchno-issledovatel'skii institut zheleznodorozhnogo transporta. Trudy, no. 182). (MIRA 13:2)

(Remote control) (Railroads--Communication systems)



Determination of oscillation intensities in atomic spectra. D. S. Rozhdestvenski and S. P. Tyukin. (*Bull. Acad. Sci. URSS, Sér. Phys.*, 1961, **5**, 97–101).—A graphite furnace in which metal vapours at 3000° can be examined is described. The anomalous dispersion of Fe vapours at 5030–5350 A. could not be measured exactly because of the reaction between Fe and graphite; better results were achieved with the Cr triplet 5204·08–5208·59 A. The probability of oscillations causing these lines agrees with theory. From the intensity of Na and Hα lines it is suspected that thermal equilibrium was not reached in the furnace. J. J. H.



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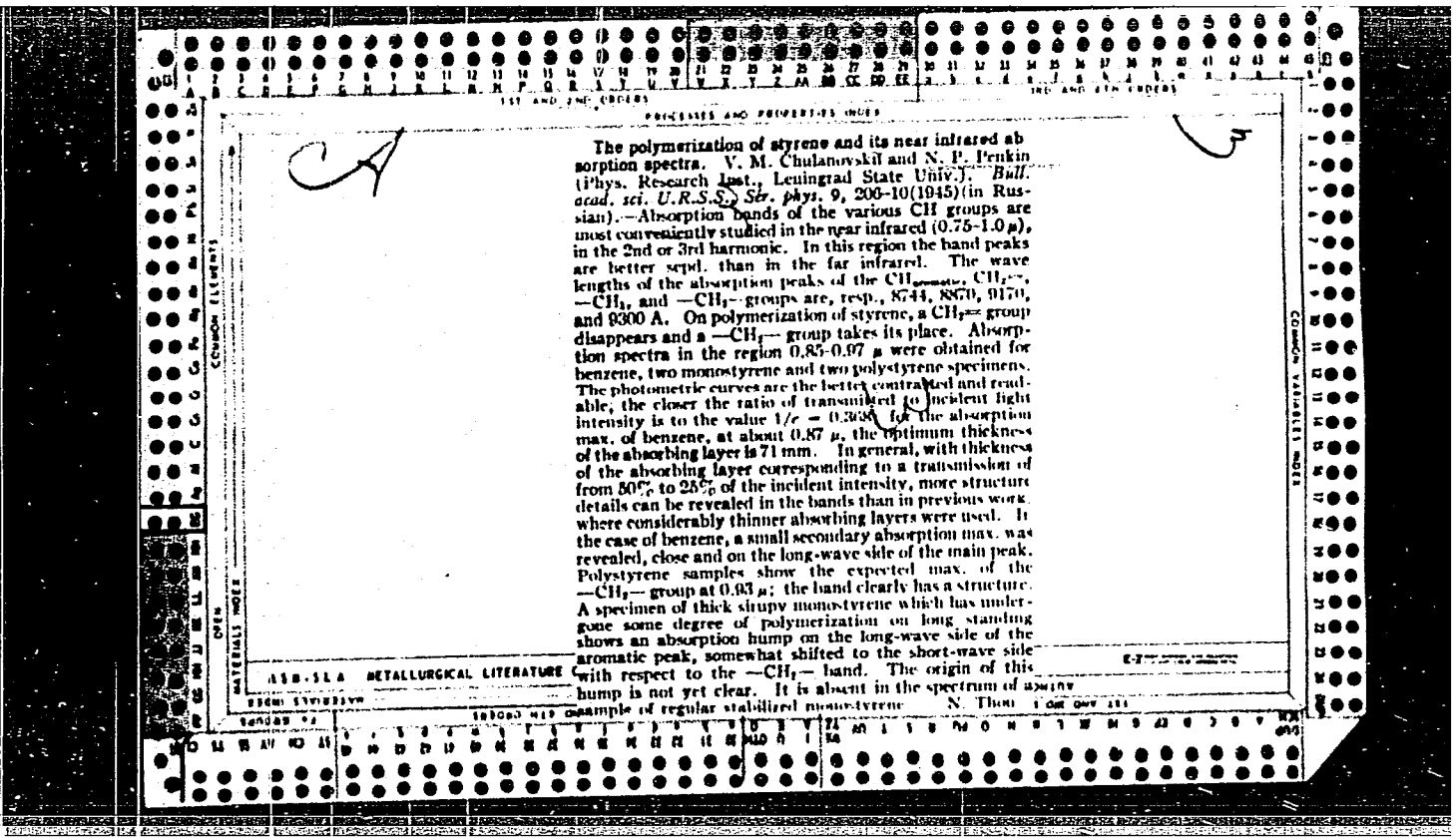
Determination of the vibrator strengths in the atomic spectra. ROOSENWINKEL, D. S., AND PENKIN, N. P. *J. Phys., U.S.S.R.*, 5, 5–6, *pp.* 319–337, 1941.—The adaptability of the "hook" method in the determination of the intensities of lines in the spectra of refractory elements has been investigated. Observations were carried out with a specially designed interferometer. A column of vapours of the element was obtained in a King's furnace and the temperature brought up to 3 000°C. The intensities of 16 lines in the spectrum of Fe were determined visually. A close triplet $^5S_2$–$^5P_{1,2,3}$ in the Cr spectrum was photographed. A calculation method is elaborated to account for the influence of any number of very close neighbouring lines. Measurements were taken of the anomalous dispersion in the subordinate series of K and Na and of some lines of normal and ionized Ba.



The polymerization of styrene and its near infrared absorption spectra. V. M. Chulanovskiĭ and N. P. Penkin (Phys. Research Inst., Leningrad State Univ.). *Bull. acad. sci. U.R.S.S., Sér. phys.* 9, 200-10(1945)(in Russian).—Absorption bands of the various CH groups are most conveniently studied in the near infrared (0.75-1.0 μ), in the 2nd or 3rd harmonic. In this region the band peaks are better sepd. than in the far infrared. The wavelengths of the absorption peaks of the $CH_{aromatic}$, $CH_2=$, $-CH_3$, and $-CH_2-$ groups are, resp., 8744, 8870, 9170, and 9300 A. On polymerization of styrene, a $CH_2=$ group disappears and a $-CH_2-$ group takes its place. Absorption spectra in the region 0.85-0.97 μ were obtained for benzene, two monostyrene and two polystyrene specimens. The photometric curves are the better contrasted and readable, the closer the ratio of transmitted to incident light intensity is to the value $1/e = 0.3678$ for the absorption max. of benzene, at about 0.87 μ, the optimum thickness of the absorbing layer is 71 mm. In general, with thickness of the absorbing layer corresponding to a transmission of from 50% to 25% of the incident intensity, more structure details can be revealed in the bands than in previous work where considerably thinner absorbing layers were used. In the case of benzene, a small secondary absorption max. was revealed, close and on the long-wave side of the main peak. Polystyrene samples show the expected max. of the $-CH_2-$ group at 0.93 μ; the band clearly has a structure. A specimen of thick stupy monostyrene which has undergone some degree of polymerization on long standing shows an absorption hump on the long-wave side of the aromatic peak, somewhat shifted to the short-wave side with respect to the $-CH_2-$ band. The origin of this hump is not yet clear. It is absent in the spectrum of a sample of regular stabilized monostyrene. N. Thon

PENKIN, N. P.

PA 24T96

USSR/Physics May/Jun 1947
Ionization
Barium

"D. S. Rozhdestvenskiy's Method of Investigating the Thermal Ionization of Barium Vapors," N. P. Penkin, 3 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XI, No 3 - p. 217-20

This article is interesting, not from the standpoint of its proof of Sakh's formula, but because of the absence of provisions for thermal equilibrium between ions, atoms and electrons. Apparently these provisions, which make exact measurements very difficult, are absent in King's furnaces, as the partial pressure of metal vapors does not conform to the

24T96

USSR/Physics (Contd) May/Jun 1947

measured pressure. In addition, there is the possibility of the appearance of pressure gradients. Nevertheless, the general thermal progress curve coincides with the experimental curves. Submitted to the Physics Institute of Leningrad State University.

24T96

PA 34T78

USSR/Physics
Dispersion
Interferometry

Apr 1947

"Anomalous Dispersion in Chrome Vapors," N. P. Penkin, 11 pp

"Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki" Vol XVII, No 4 - pp. 355-65

Anomalous dispersion in chrome vapors is studied in an interferometer apparatus, including a King vacuum furnace. Using Rozhdestvenskiy's method the f numbers of chrome lines have been determined. The experimental results are found to agree within 1.3% with the theoretical values. Photographs of hooks

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USSR/Physics (Contd)

Apr 1947

near the triplet lines $^7S_3 \rightarrow {}^7P_{4,3,2}$ and $^5S_2 \rightarrow {}^5P_{1,2,3}$ taken in the temperature range of the furnace from 2,100 to 2,700° K permits the conclusion that up to 2,700° K there exists thermodynamical equilibrium in the King furnace.

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34T78

PENKIN, N. P.

CA

Measurement of the relative oscillator strengths in the multiplets of chromium. N. P. Penkin. *Zhur. Eksptl. Teoret. Fiz.* 17, 1114-21(1947).—The anomalous dis-
persion around the absorption lines of 6 multiplets in the
visible region was investigated in King's furnace, with
Cr_3C_2 used to produce Cr vapor. The relative transition
probabilities *f* were detd. for 32 components. For the
triplets $a^7S_3 - z^7P^\circ_{4,3,2}$, $a^5S_2 - y^5P_{3,2,1}$ and $a^5S_2 -$
$z^5P^\circ_{1,2,3}$, the ratios of *f* are equal to the ratios of the
statistical wts. of the upper levels. The relative intensi-
ties, calcd. from the *f*, in the multiplets $a^5D - z^5P^\circ$ and
$a^5D - z^5F^\circ$, are in agreement with both Kronig's formula
and the measurements of Frerichs (C.A. 21, 7183). A
Boltzmann distribution of the energy levels of atoms was
assumed.

N. Thon

USSR/Physics
Plasma
Spectrum

Jul/Aug 48

"Determining the Population of Atomic Levels by the Conversion Method," N. P. Penkin, A. M. Shukhtin, Sci Res Phys Inst, Leningrad State U, 6 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XII, No 4 - p.376-81

PA 53/49T97

Attempts to clarify excitation conditions existing in a high-temperature furnace and in the positive discharge column in cesium vapors. Finds that plasma in a high-temperature furnace is isothermic and, from this standpoint, excitation of atoms is purely of a temperature nature. Conversion temperature for lines

53/49T97

USSR/Physics (Contd) Jul/Aug 48

with low levels is equal to the electron temperature, and equilibrium distribution of atoms according to energy levels occurs at a temperature equal to the electron temperature of the plasma.

53/49T97

PENKIN, N. P.

FA 9/49T92

USSR/Physics — Aug 48
Spectrum Analysis
Furnaces

"Excitation Mechanisms of Spectrum Lines in a High-Temperature Vacuum Furnace," S. E. Frish, N. P. Penkin, A. M. Shukhtin, Phys Inst, Leningrad State U, 3 pp

"Zhur Eksper i Teoret Fiz" Vol XVIII, No 8
p 734-6

Shows by spectrum line conversion method, that in a high-temperature vacuum furnace, atoms are equally distributed on excitation level. Temperature corresponds to distribution within limits of measuring error and coincides with temperature of furnace wall.

[redacted] 9/49T92

USSR/Physics (Contd) — Aug 48

Determined, from this, temperature characteristics of spectrum line excitation in a vacuum furnace.

[redacted] 9/49T92

PENKIN, N. P.

PENKIN, N. P.

(3)

Excitation of spectral lines in a high-temperature vacuum furnace. N. P. Penkin and A. M. Shukhtin (Leningrad State Univ.). *Uchenye Zapiski Leningrad Gosudarst. Univ. A.A. Zhdanova* No. 120, *Ser. Fiz. Nauk* No. 7, 28–35 (1949); cf. *Zhur. Eksptl. i Teoret. Fiz.* 17, 305(1947); *C.A.* 42, 1799c, 3789defgh; 46, 6032a.—With a modified King-type vacuum furnace (4–5 mm. pressure) with a W light source (2100–2700°K.), and a self-collimating spectrograph with an aluminized mirror and a const. focal point from infrared to ultraviolet, P. and Sh. studied the spectra of Ba and of Sr. The studies show that the energy-distribution for various atoms and ions obeys the Boltzmann thermal distribution law. The following lines were observed: for Ba 5853.69, 5826.30, 5818.93, 5500.3, 5777.7, 5519.11, 4934.09, 4902.88, 4877.65, 4726.45, 4700.45, 4619.98; for Sr, 4967.72, 4962.25, 4892.01, 4876.07, 4872.48, 4868.74, 4855.07, 4832.07, 4215.52, 4077.71. F. H. Rathmann

PENKIN, N. P.

PA 170T91

USSR/Physics - Gaseous Discharge Nov/Dec 50

"Concentration of Excited Atoms in a Mercury Discharge," Yu. M. Kagan, N. P. Penkin, Sci Res Phys Inst, Leningrad State U imeni Zhdanov

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIV, No 6, pp 721-6

Studies following dependences: electron temperature vs pressure; electron concentration vs pressure, discharge current strength; population of various electron levels vs pressure and electron concentration. Authors thank S. E. Frish and Ye. I. Pokrovskiy for their assistance.

170T91

PENKIN, N.

M. Phys
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Nuclear Sci. Abs.
V-8 Jan 15, 1954
8 Lyons

CONCERNING THE EXCITATION OF ATOMS IN A MERCURY DISCHARGE. Yu. Kagan and N. Penkin. Translated from Zhur. Eksptl'. i Teoret. Fiz. 21, 1182-3 (1951). 4p. (AEC-tr-1723)

PENKIN N.P.

5

Determination of oscillator strengths for iron and nickel. G. F. Parchevskii and N. P. Penkin. *Vestnik Leningrad. Gos. Univ.* 9, No. 11, *Ser. Mat., Fiz. i Khim.* No. 4, 113-18 (1954).—Values of oscillator strengths f (56 for Fe and 45 for Ni are tabulated) were detd. by the interferometric method of "anomalous dispersion" by using the app. previously described (cf. *C.A.* 37, 2265[1]; 42, 1799c; 44, 8705a).—The quantity f is evaluated from the formula $f = aK\Delta^2/N\lambda^2$, where a and K are consts., N is concn. of atoms at the lower level of the transition, and Δ is the distance between interference bands in the vicinity of the absorption line corresponding to the wave length λ. Ivan Pascal

(1)

PENKIN, N P

Determination of the concentration of excited mercury atoms in discharge tubes containing mercury vapor and inert gases. N. P. Penkin and M. N. Palludin. *Vestnik Leningrad Univ. 10, No. 3, Ser. Mat., Fiz. i Khim.* No. 3, [illegible]

2

[illegible] approach equal values at [illegible] and [illegible] to [illegible] mercury vapor pressure. [illegible] concn. of the $^3P_1$ state. V [illegible] found to be less than 0.5% of the total. The data are explained by the mechanism in which the destruction of V proceeds via the collision of V with electrons, whereas the [illegible]

PENKIN, N.P

PARCHEVSKIY,G.F.; PENKIN,N.P.

Oscillator power determination in iron and nickel spectra. Izv. AN SSSR Ser. fiz. 19 no.1:8-9 Ja-F '55. (MLRA 8:9)

1. Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta imeni A.A.Zhdanova

(Spectrum analysis) (Spectrometer)

PENKIN,N.P.; PALLADIN,M.N.

Determination of the concentration of excited mercury atoms in discharges in mercury vapor and inert gas mixtures. Izv. AN SSSR Ser. fiz. 19 no.1:16-17 Ja-F '55. (MIRA 8:9)

1. Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta imeni A.A.Zhdanova

(Spectrum analysis) (Spectrometer)

PENKIN, N.P.

USSR/Physics - Spectroscopy FD-1863

Card 1/1 Pub. 146-23/25

Author : Parchevskiy, G. F., and Penkin, N. P.

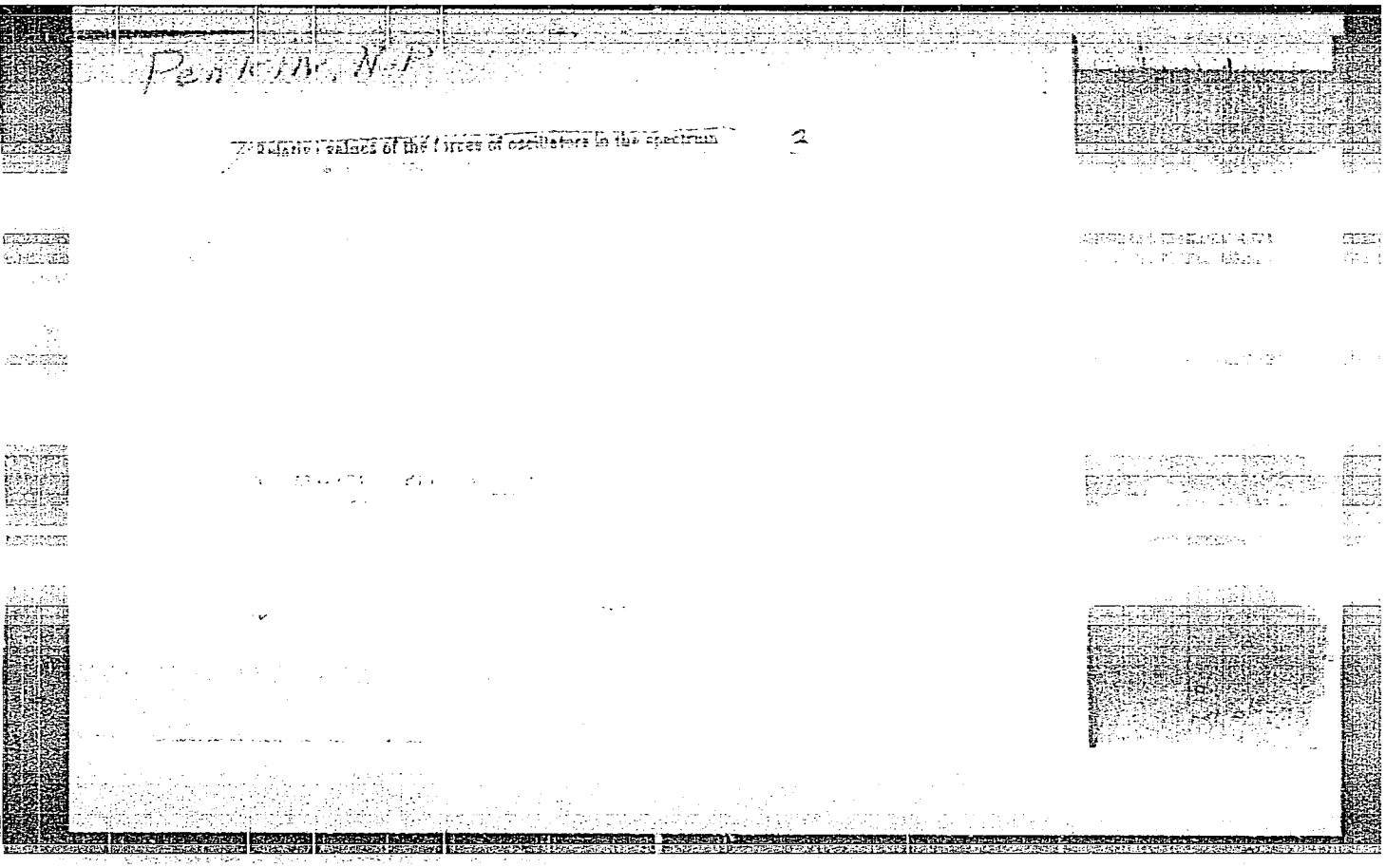
Title : The ratio of the forces of oscillators for the components of the resonance doublets of aluminum and copper

Periodical : Zhur. eksp. i teor. fiz. 28, 379, March 1955

Abstract : The apparatus employed in the present work consists of a source of continuous spectrum (SVD lamp with krypton), large interferometer of D. S. Rozhdestvenskiy with distance between mirrors of 30 cm, and spectral device (quartz spectrograph E-1). The apparatus was described in detail by N. P. Penkin (ibid., 17, 355, 1947). By means of it the authors obtained spectrograms containing photographs of absorption lines of Al and Cu, from which the relative values of the f numbers were computed for the components of the doublet. Three references.

Institution: Leningrad State University

Submitted : September 29, 1954



PENKIN, N.P.

AUTHOR: Penkin, N.P. 51-5-1/26

TITLE: On the Concentration of Excited Atoms in a Discharge in Cadmium and Neon. (O kontsentratsii vozbuzhdennykh atomov v razryade v kadmii i neone)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.2, Nr 5, pp.545-556 (USSR).

ABSTRACT: Gases introduced into a discharge which occurs in metal vapours change the electron concentration and the electron temperature and may produce redistribution of the population of excited levels in atoms as a result of collisions. Such discharges are best studied by simultaneous application of optical and electrical methods. In this connection the method of "hooks" (optical dispersion) of D.S. Rozhdestvenskiy (Ref.1) is very useful. This paper reports results of the study of concentration of the excited atoms of cadmium and neon and dependence of this concentration on pressure and discharge current. The following discharges were studied by the method of "hooks" and a probe method: 1) in vapours of cadmium with argon and 2) in mixtures of neon and other inert gases. The measurements for cadmium discharges were made at cadmium pressures of 6.5×10^{-3} and 3×10^{-2} mm Hg and discharge currents of

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On the Concentration of Excited Atoms in a Discharge in Cadmium and Neon.

about 200 mA. The argon pressure varied from 0.1 to 4 mm Hg. In neon discharges the currents were from 5 to 300 mA, and the pressures about 1.2 mm Hg. It was found that with increase of the argon pressure the population of the $5^3P_{0,1,2}$ levels in cadmium changes non-monotonically. The curve of the 5^3P_2 level population has one maximum, and the curve for the $5^3P_{0,1}$ levels has two maxima. The relative f numbers for the cadmium lines with lower $5^3P_{0,1,2}$ levels were determined. They are given in Table 1 on p.550 for the following pairs of lines (all wavelengths in Å): 5086/3610, 5086/3613, 4800/3468, 4800/3466, 4678/3404. Photoelectric measurements of the dependence of the total intensity of the divisible triplet of cadmium on the discharge current lead to the conclusion that at currents larger than 1.5 A about half of the excitations of the 6^3S_1 level are produced in a step-wise fashion through the $5^3P_{0,1,2}$ levels.

Card 2/3 The concentrations of the metastable neon atoms, determined

On the Concentration of Excited Atoms in a Discharge in Cadmium and Neon.

by the "hooks" method and calculated from the Boltzmann formula, differ by a factor of about 1000 (for the $^3P_2$ level at 60 mA the experimental concentration was 12.6×10^{11} cm^{-3}). Argon, krypton and xenon, introduced into the neon discharge even in small quantities (about 1%), unlike helium, lower the population of the metastable level $^3P_2$ by one order of magnitude. The probability of ionisation of an argon atom by metastable neon atoms was found to be 0.07. The author thanks Prof. S.E.Frish for his advice and interest. L.N.Shabanov, E.V.Burlakov, A.Buchinskiy and G.A.Pivanovich took part in the experimental work.

There are 10 figures, 2 tables and 17 references, of which 9 are Slavic.

ASSOCIATION: Physical Research Institute, Leningrad University. (Nauchno-Issledovatel'skiy Fizicheskiy Institut Leningradskogo Universiteta)

SUBMITTED: November 1st, 1956.

AVAILABLE: Library of Congress.

Card 3/3

PENKIN, N.P.

AUTHORS: Ostrovskiy, Yu. I., and Penkin, N. P. 51-3-1/14

TITLE: Absolute Values of Oscillator Strengths for the Lines of Chromium, Manganese and Copper. (Absolyutnyye znacheniya sil ostsillyatorov dlya liniy khroma, margantsa i medi.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.3, pp.193-201. (USSR)

ABSTRACT: Measurements of the oscillator strengths were carried out using D. S. Rozhdestvenskiy's method of "hooks". Earlier results (Refs.1-3) are shown to be unreliable. Fig.1 shows the apparatus used. It consists of a source of continuous spectrum S, & lenses L_1, L_2 and L_3. The latter lense focusses interference bands on a vertical slit of a spectrograph Sp. A column of vapours of the metal studied was contained in evacuated sealed quartz vessels (12-17 cm long) with plane-parallel windows. To obtain easily measurable "hooks" for copper it had to be heated above its melting point. Liquid copper interacts chemically with quartz and had to be placed

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Absolute Values of Oscillator Strengths for the Lines of Chromium, Manganese and Copper.

in a tantalum boat. The vessel containing metal vapours was placed in a long quartz tube with windows cooled by water. The pressure in this tube was less than 0.01 mm Hg. The quartz tube with the vessel in it was placed in an electrical furnace. The path difference introduced in the interferometer by the tube and vessel is compensated by an evacuated tube (AB' in Fig.1) which has four plane-parallel quartz windows. This second tube was placed together with a fluorite plate K in the second beam of the interferometer. Spectrograms were obtained at several temperatures, and at each temperature 5-6 photographs were taken. For chromium "hooks" were recorded for absorption lines of triplets -

$a^7S_3-y^7P^0_{4,3,2}$ ($\lambda\lambda$ 3578.7, 3593.5 and 3605.3 Å) and

$a^7S_3-z^7P^0_{4,3,2}$ ($\lambda\lambda$ 4254.3, 4274.8 and 4289.7 Å) at temperatures of 1459, 1469 and 1492°K. Fig.2 shows a photograph of "hooks" for the ultraviolet triplet at 1459°K. Table 2 gives the absolute values of the

Absolute Values of Oscillator Strengths for the Lines of Chromium, Manganese and Copper.

oscillator strengths f of the resonance lines of chromium. The results are given for the 6 lines mentioned above. Col.4 in Table 2 gives the present authors' results, Col.5 gives results of Huldt and Lagerqvist (Ref.2) and Col.6 repeats the results of Estabrook (Ref.1). Estabrook's results are 1.8 times smaller than those of the present authors, and those of Huldt and Lagerqvist are 2.5 times smaller. These large discrepancies are due to incorrect values for concentrations of atoms of chromium in flames obtained by these authors. Combining the results of Col.4 Table 2 with those of N. P. Penkin (Ref.4), who gives relative values of the f numbers, the absolute f numbers for Cr were found (Table 3). For manganese the hooks were photographed for the absorption lines of the violet triplet $a^6S_{5/2}-z^6P^0_{7/2,5/2,3/2}$ ($\lambda\lambda$ 4030.75, 4033.07 and

Card 3/5 4034.49 Å). The vessel temperature was varied from

1204 to 1377°K. Fig.4 shows a photograph of the "hooks" taken at 1377°K. Since the above triplet was narrow and anomalous dispersion was strong, it was necessary to take dispersion effects into account. Table 5 gives the absolute values of the f numbers of manganese lines. This table includes results of Ref.6 and of Ref.2 (Col.5 in Table 5). The present authors' results for manganese were found to agree with those of Huldt and Lagerqvist (Ref.2). For copper, "hooks" were photographed for the resonance lines λ 3247.55 ($^2S_{1/2}$-$^2P_{3/2}$) and λ 3273.96 Å ($^2S_{1/2}$-$^2P_{1/2}$) at temperatures from 1375 to 1469°K. Fig.5 shows a photograph of the "hooks" taken at 1460°K. The mean value of f for λ 3247.55 Å line was found to be 0.74. For the λ 3273.96 Å line f was found to be 0.38. These values are less than 20% different from King and Stockbarger's results (Ref.3). The f value for the λ 5105.58 Å line was also determined and found to be 0.011.

In the experiments reported in this paper saturation vapour pressures of chromium were varied by a factor of 2, for manganese by a factor of 22 and for copper by a factor of 5. For all these pressures the absolute values of the f numbers were found to be constant within the experimental error. The authors thank Professor S. E. Frish for his interest in their work. There are 5 figures, 6 tables and 20 references, 8 of which are Slavic.

ASSOCIATION: Institute of Physics of the Leningrad State University. (Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta.)

SUBMITTED: January 23, 1957.

AVAILABLE: Library of Congress

PENKIN, N.P.

AUTHORS: Ostrovskiy, Yu. I. and Penkin, N. P. 51-4-19/26

TITLE: The Relative f-Numbers of Spectral Lines of Scandium. (Otnositel'nyye chisla f-spektral'nykh liniy skandiya).

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.4, pp.391-393. (USSR)

ABSTRACT: Beginning with scandium (Z = 21) filling of the 3d-shell occurs. The ground level of the scandium atom ^2D is split into two sublevels $^2D_{3/2}$ and $^2D_{5/2}$, separated by 0.02 eV from one another. D. S. Rozhdestvenskiy's method of "hooks" was used in the present paper to find relative values of the f-numbers of spectral lines of Sc I. For this purpose an interferometric apparatus (Refs.1, 2) was used together with a high-temperature vacuum furnace of King. Scandium oxide (Sc_2O_3) was placed in a graphite tube. Such a tube ensures a better distribution of temperature in the furnace, and therefore it decreases experimental errors (Ref.2). The "hooks" were recorded at temperatures from 2500 to 30000°K

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The Relative f-Numbers of Spectral Lines of Scandium. 51-4-19/26

(Abstractor: This is probably a mistake for 3000°K) in the second order spectrum using a diffraction spectrograph with 4 Å/mm dispersion. In the spectral region of 3000-6400 Å 33 absorption lines of scandium were suitable for measurement of "hooks". 22 such lines belong to 9 multiplets beginning from the ground level a^2D; the remaining 11 lines belong to 4 multiplets with lower levels a^4F (1.43 eV) and a^2F (1.85 eV). Fig.1 shows "hooks" for lines from a^2D level. The photograph shows also "hooks" around resonance lines of manganese which was present in the furnace as an impurity. Fig.2 shows a photograph of "hooks" for lines from a^4F level which is separated by 1.43 eV from the ground level. In calculation of the result the effect of dispersion in neighbouring lines was taken into account. The table on p.392 shows the results of measurements. The first four columns contain data taken from Ref.3. These four columns give, respectively, multiplet number, wavelength, transition and j-numbers of the lower and upper levels. The 5th column gives the f-numbers found by the present authors. These numbers are given as relative quantities referred to

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The Relative f-Numbers of Spectral Lines of Scandium.

the f-number for 4082.396 Å taken as 1000. The errors in f-numbers are 3-8% for the lines from a^2D level and 10-15% for the lines from the a^4F and a^2F levels. The 6th column of the table gives the values, calculated by the present authors, of relative intensities for the lines of each multiplet. The 7th column contains the same intensities calculated theoretically from formulas given in Ref.4. A good agreement is observed between the values of the 6th and 7th columns. This fact indicates that L-S binding occurs in scandium. The last (8th) column of the table shows the number of photographs used in obtaining the results of previous columns. There are 2 figures, 1 table and 4 references, 2 of which are Slavic.

SUBMITTED: March 21, 1957.

AVAILABLE: Library of Congress.

Card 3/3

PENKIN, N. P.

51-5-5/11

AUTHORS: Penkin, N.P. and Frish, S.E.

TITLE: A Study of Emission and Absorption Spectra of Uranium. (Issledovaniye spektrov ispuskaniya i pogloshcheniya urana)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr 5, pp.473-479 (USSR)

ABSTRACT: Absorption and emission spectra of uranium have been studied, using thermal excitation of uranium atoms in a King furnace in the temperature range 2800-3000°K. 167 emission lines and 47 absorption lines were observed. All the lines observed fall into the series scheme of Kiess et al (Ref.1). The experimental apparatus consists of a source of continuous spectrum (carbon arc), focussing lenses, high temperature vacuum furnace and an objective which focusses the radiation emitted by the furnace on the slit of the spectrograph. The furnace has already been described in Ref.(5). The uranium spectrum was photographed on the spectrograph ИСП-22 in the region 2300-3800 Å, and using an autocollimating spectrograph with a plane diffraction grating (50 000 lines) in the region 3800 to 6600 Å. Spectrograms were taken in the 2nd order of the grating where the dispersion was approximately 5.5 Å per mm. Uranium in the form of powder or filings was placed in a graphite tube

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A Study of Emission and Absorption Spectra of Uranium.

of the furnace, after which it was well-evacuated and then slowly heated. The spectra were photographed at temperatures between 2800 and 3000°K. The arc spectrum of iron was used for comparison. A Zeiss comparator was used for measurements on the photographs. The experiments were not successful at first because of the low vapour pressure of uranium. At such high temperatures as those above, uranium forms carbides, as a result of which its vapour pressure decreases. By replacing the graphite tubes by tantalum tubes or by separating the uranium from the graphite by tantalum the spectrum of uranium was successfully photographed. According to Ref.(1) in the region 3900 to 6600 Å there are many strong lines from the ground level $5L_6^o$ and the levels $^5K_5^o$ and A_7^o. The results obtained are given in Table 1, where the first column gives the wavelength, the second column gives the classification according to Kiess and the third column gives the intensity according to Kiess. The values of the wavelengths are taken from Harrison's tables (Ref.6). The lines which are seen in absorption are marked

A Study of Emission and Absorption Spectra of Uranium.

by an asterisk. Studies of absorption and emission spectra obtained by thermal excitation (high temperature vacuum furnace of King) have confirmed the classification given by Kiess et al in Ref.(1). It is concluded that uranium atoms do not have any levels lying deeper than 5L0. In the uranium emission spectrum observed in King's furnace there are no lines corresponding to wavelengths less than 2900 Å, which again is in agreement with results of Kiess et al.
There are no figures, 3 tables and 6 references, 2 of which are Slavic.

ASSOCIATION: Scientific and Research Institute of Physics of the Leningrad State University (Nauchno-issledovatel'skiy fizicheskiy Institut Leningradskogo gosudarstvennogo universiteta)

SUBMITTED: July 1, 1957.

AVAILABLE: Library of Congress.

PENKIN, N.P.

Concentration of excited cadmium and neon atoms in a discharge.
Fiz.sbor. no.4:56-60 '58. (MIRA 12:5)

1. Fizicheskiy institut Leningradskogo ordena Lenina gosudarstvennogo universiteta imeni A.A.Zhdanova.
(Electric discharges through gases) (Cadmium) (Neon)

OSTROVSKIY, Yu.I.; PARCHEVSKIY, G.F.; PENKIN, N.P.

Relative values of oscillator forces in the atomic spectra of titanium and manganese. Fiz.sbor. no.4:316-318 '58. (MIRA 12:5)

1. Fizicheskiy institut Leningradskogo ordena Lenina gosudarstvennogo universiteta imeni A.A.Zhdanova.
(Titanium--Spectra) (Manganese--Spectra) (Electrons--Vibration)

SOV/51-4-6-3/24

AUTHORS: Ostrovskiy, Yu.I. and Penkin, N.P.

TITLE: Measurement of Absolute Values of the Oscillator Strengths of Spectral Lines of Ga I and In I (Izmereniye absolyutnykh znacheniy sil ostsillyatorov spektral'nykh liniy Ga I i In I)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 6, pp 719-724 (USSR)

ABSTRACT: The values of the oscillator strengths f of spectral lines of Ga I and In I have not yet been measured experimentally. The present authors using "the hooks" method of Rozhdestvenskiy (Fig 1 shows "hooks" for Ga lines), found experimentally the absolute values of f of five Ga I and five In I absorption lines. These lines begin from the $^2P^o_{3/2}$ and $^2P^o_{1/2}$ levels. The measurements were made on the apparatus described in detail in Ref 1. A column of saturated vapour of the metal studied was produced in a quartz cuvette which was placed in an electric furnace. The absorption line "hooks" were measured simultaneously with the cuvette temperature. The "hooks" method gives the value Nf, where the N is the concentration of atoms in a given quantum state and f is the oscillator strength. The value of N was calculated from the saturated vapour pressure of the metal studied.

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Measurement of Absolute Values of the Oscillator Strengths of Spectral Lines of Ga I and In I

To calculate the absolute values of f for Ga the author used the experimental values given by Speiser and Johnston (Ref 2). Table 2 gives the wavelengths (first column), transitions (second and third columns) and the absolute f values obtained for Ga, the latter with an accuracy of 1-5%. To calculate the absolute values of f for In the authors used Anderson's (Ref 3) results, who measured saturated vapour pressure of helium at 1000-1348°K. Table 4 gives the wavelengths (first column), transitions (second and third columns) and the absolute f values for In, the latter with precision of 10-15%. Table 5 gives the results of all known experimental and theoretical values of f for the short-wavelength component of the main doublet of the sharp series of group III elements. For Ga I the results of L.A. Vaynshteyn (private communication) agree satisfactorily with the results of the measurements made by the present authors. For In I, however, the calculated and measured

Measurement of Absolute Values of the Oscillator Strengths of Spectral Lines of Ga I and In I

values of f differ by a factor of 2. This difference is due to errors in the quantum-mechanical calculations. Fig 5 gives the dependence of the oscillator strengths of the group III elements on atomic number. There are 5 figures, 6 tables and 12 references, 7 of which are Soviet, 2 American, 1 English and 2 German.

ASSOCIATION: Leningradskiy Gosudarstvennyy Universitet, Fizicheskiy Institut (Leningrad State University, Physics Institute)

SUBMITTED: July 16, 1957.

SOV/51-5-4-1/21

AUTHOR: Ostrovskiy, Yu.I. and Penkin, N.P.

TITLE: The Relative Values of the f-Numbers of Vanadium and Cobalt Spectral Lines (Otnositel'nyye znacheniya chisel f spektral'nykh liniy vanadiya i kobal'ta)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 4, pp 345-353 (USSR)

ABSTRACT: The relative values of the oscillator strengths f of V I lines were measured by King (Ref 1) by the total absorption method. Using the same method King (Ref 2) found the relative values of the f-numbers of 256 Co I lines. The results obtained by the absorption method are highly scattered, even when obtained by one author (Refs 3,4). The "hook" method of D.S. Rozhdestvenskiy is more reliable and precise in studies of strong absorption lines, which begin from a ground level or from levels close to it. The "hook"method is less sensitive than the absorption method. The present authors could not measure the f-values for lines from levels further than 1.5 eV from a ground level. If the wavelength difference was smaller than 0.5 Å, the results obtained by the"hook"method are not sufficiently accurate. For these reasons the oscillator strengths of V I and Co I were obtained on a smaller

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The Relative Values of the f-Numbers of Vanadium and Cobalt Spectral Lines

number of lines than in Refs 1, 2. The apparatus which was used is described in Refs 5, 6. The metal studied was in the form of a vapour in a vacuum furnace which was introduced into an interferometric system. The hooks were photographed for V lines in the 3000-4900 Å region (Fig 1) at temperatures from 2500 to 2750°K and for Co lines in the 2990-4200 Å region (Fig 2) at temperatures from 2200 to 2800°K. The results were given in Tables 1 and 2 for V and Co respectively. The first four columns of both tables give the data on various lines taken from Moore's tables (Ref 8). The fifth and sixth columns in the tables give the f-values obtained by King et al., (Refs 1, 2) and the present authors, respectively. The seventh column gives the number (n) of spectrograms used to determine the particular f-value. The last three columns give, respectively, the theoretical (from Ref 8), present authors' and King's values of the line intensities. Figs 2 and 3 compare the f-values reported by King et al. (shown as ordinates) and the f-values obtained by the present authors (shown as abscissae). Fig 2 deals with vanadium; the agreement between the majority of the f-values is within 15%. Fig 3 deals with cobalt; the large differences between the two groups of the f-values are attributed to errors in the absorption method employed by King et al. The present work completes a

SOV/48-22-6-22/28

AUTHORS: Ostrovskiy, Yu. I., Penkin, N. P., Shabanova, L. N.

TITLE: The Measurement of Oscillator Strength in Atomic Spectra (Izmereniye sil ostsillyatorov v spektrakh atomov)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 6, pp. 725-729 (USSR)

ABSTRACT: By means of the "crotch"-method (met. kryukov) and by the method of total absorption the aboslute values of the number f were determined for various reconance lines:

transitions	Ca I		In I	
	λ	f	λ	f
$^2p^o_{2/3}$ – $^2S_{1/2}$	4172	0,135	4511	0,218
$^2p^o_{1/2}$ – $^2S_{1/2}$	4032	0,129	4102	0,201
$^2p^o_{3/2}$ – $^2D_{5/2}$	2943	0,287	3256	0,509

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The Measurement of Oscillator Strength in Atomic Spectra

transitions	Ga I		In I	
	λ	f	λ	f
$^2P^o_{1/2} - {}^2D_{3/2}$	[illegible]	0,319	3039	0,503
$^2P^o_{3/2} - {}^2D_{3/2}$	2944	0,038	3258	0,079

element	λ (Å)	f
Mg	2852	1,2 ± 0,3
Ca	4227	1,3 ± 0,2
Sr	4607	1,5 ± 0,2
Ba	5535	1,7 ± 0,2

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The Measurement of Oscillator Strength in Atomic Spectra

The above data are partly compared with other experimental and theoretical predictions, and in some cases satisfactory and in other cases unsatisfactory agreement is found to exist. If the f-values of Mg, Ca, Sr, and Ba are plotted in dependence of their atomic number, it will be found that the number f grows linearly with Z. There are 2 figures, 2 tables, and 32 references, 17 of which are Soviet.

ASSOCIATION: Fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova
(Physics Institute of Leningrad State University imeni A. A. Zhdanov)

1. Atomic spectra 2. Perturbation theory

AUTHORS: Ostrovskiy, Yu. I., Penkin, N. P., Shabanova, L. N. SOV/20-120-1-16/63

TITLE: The Absolute Values of Forces of Mg I, Ca I, Sr I and Ba I Resonance Lines Oscillators (Absolyutnyye znacheniya sil ostsillyatorov rezonansnykh liniy MgI, CaI, SrI i BaI)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 1, pp. 66 - 68 (USSR)

ABSTRACT: The measuring of the absolute values of the number of oscillators (the number f) by the existing methods usually is connected with the necessity to determine the concentrations of the emitting or absorbing atoms. In some cases these methods in their traditional form are not suited for the determination of the absolute numbers f of the spectral lines of these elements. In order to avoid these difficulties the authors employ a new method for the determination of the absolute values of the oscillator forces. This method is based on the simultaneous measuring of the total absorption and of the dispersion. In this method there is no necessity to produce a vapor column of known and unknown concentration of the absorbing atoms. When

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the equivalent width A_λ of the absorption lines and the distance Δ_{ik} from the tips of the "hooks" (kryuk) are measured on the same conditions the attenuation coefficient γ can be determined. This attenuation coefficient is determined by the life of the upper and lower level as well as by the coefficient of the attenuation due to collisions. For the purpose of checking this method the authors determined the number f of the lines $^2p_{1/2} - {}^2s_{1/2}$ (λ = 4102 Å) of InI. By means of this method the values of f of the resonance line ($^1p_1 - {}^1s_o$) were determined for Mg I, Ca I, Sr I and Ba I. The results of the experiments and the results obtained by other authors are compiled in a table. The accuracy of the number f obtained in the simultaneous measuring of the absorption and dispersion is small; it can, however, be increased by using photoelectric methods of registration. A diagram shows the dependence of the measured numbers f on the nuclear charge number Z of the element. f increases

The Absolute Values of Forces of Mg I, Ca I, Sr I and Ba I Resonance Lines Oscillators SOV/ 2o-12o-1-16/63

linearly with increasing Z. There are 1 figure, 1 table, and 11 references, 5 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova (Leningrad State University imeni A.A.Zhdanov)

PRESENTED: February 6, 1958, by A.N.Terenin, Member, Academy of Sciences, USSR

SUBMITTED: January 29, 1958

1. Iodides--Spectra 2. Plasma oscillations--Measurement
3. Resonance potential--Determination 4. Mathematics--Applications

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PENKIN, N.P.

24(4),24(7) SOV/53-69-1-10/11

AUTHORS: Bogdanova, I. P., Bochkova, O. P., Zaydel', A. N., Zakharova, V. M., Kagan, Yu. M., Kaliteyevskiy, N. I., Penkin, N. P., Chayka, M. P., Shukhtin, A. M., Lipis, L. V.

TITLE: Sergey Eduardovich Frish (Sergey Eduardovich Frish). On the Occasion of His Sixtieth Birthday (k shestidesyatiletiyu so dnya rozhdeniya)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 69, Nr 1, pp 165-167 (USSR)

ABSTRACT: On June 19th, 1959, the well-known Soviet physicist S. E. Frish, who made a name for himself especially in the field of spectroscopic optics, attained the age of sixty. He began his scientific work as a student at the fiziko-matematicheskoye otdeleniye Leningradskogo universiteta (Physico-mathematical Department of Leningrad University) under D. S. Rozhdestvenskiy. After completing his university studies he continued his work at the Gosudarstvennyy Opticheskiy institut (Optical State Institute). Since 1934 he held a chair for optics and supervised work at the Physics Department, first as dean and later as director of the Nauchno-issledovatel'skiy fizicheskiy institut LGU (Scientific Research Institute for Physics at Leningrad

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State University). In 1946 he was appointed Corresponding Member, AS USSR, and took active part in the work of the Academy. He is deputy chairman of the spectroscopy Committee, chief editor of the periodical "Optika i spektroskopiya" and member of the International Committee for spectroscopy at the UNESCO. He first concentrated his scientific interest on atomic energy, the systematics of atomic spectra, the Zeeman effect in the sodium and potassium spectrum, as well as upon experimental spectroanalytical investigations. In 1930 he started a cycle of works, which was devoted to optical methods of investigating the properties of the atomic nucleus. (An investigation of the interaction between nucleus and electron shell led to the discovery of the hyperfine structure of spectra). He investigated the hyperfine structure of Na and set up a rule concerning the interrelation between nucleus-spin and parity. He further investigated the fine structure of isotope mixtures, the excitation mechanism of the higher atomic levels, and questions of the interaction of elementary

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particles. Finally, mention is made of his pedagogical activities, especially his courses in physics (which are partly held together with A. V. Timoreva). There are 1 figure and 42 Soviet references.

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PERKIN, N.P.; REDʹKO, T.P.

Relative oscillator strengths of some lines of zinc iodide and cadmium iodide. Opt. i spektr. 9 no.5:680-682 N '60.
(MIRA 13:11)

(Zinc iodide--Spectra) (Cadmium iodide--Spectra)

OSTROVSKIY, Yu.I.; PENKIN, N.P.

Measurement of the f numbers of the spectral lines of barium.
Opt. i spektr. 9 no. 6:703-706 D '60. (MIRA 14:1)
(Barium--Spectra)

S/051/61/010/001/002/017
E201/E491

AUTHORS: Ostrovskiy, Yu.I. and Penkin, N.P.

TITLE: Measurement of the Absolute Oscillator Strengths of the Resonance Lines of Calcium, Strontium and Barium Ions

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.8-14

TEXT: Rozhdestvenskiy's "hooks" method was used to measure the absolute oscillator strengths of the resonance doublets of Ca II, Sr II and Ba II. The apparatus is described in detail in earlier work (Ref.1,6,7). The metals were placed in the graphite tube of a King's furnace. The furnace was filled with argon at 100 to 200 mm Hg pressure and heated slowly until the melting point of a given metal was reached. Next, the furnace temperature was raised rapidly to the maximum that could be produced in this apparatus and then the furnace was allowed to cool and argon was evacuated. This was done to avoid deposition of metals on the furnace windows. Finally, the furnace was heated rapidly to a temperature at which "hooks" appeared, which

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Measurement of the Absolute Oscillator Strengths of the Resonance Lines of Calcium, Strontium and Barium Ions

were photographed (photographs of strontium line "hooks" are shown in Fig.1 and 5). In order to reduce the effect of random errors, the number of photographs taken for each line was at least 80 and sometimes 180. The temperature dependences of the oscillator strengths are shown in Fig.2 to 4; the scatter of the experimental points in Fig.2 to 4 gives some idea of the precision of these measurements (the mean values are indicated by dashed lines). The mean oscillator strengths (f) are listed in col.4 of Table 1. They were (the wavelengths in Å are given in brackets): f = 0.78 (3933.67) and 0.40 (3968.47) for Ca II; f = 0.75 (4077.71) and 0.38 (4215.52) for Sr II; f = 0.70 (4554.04) and 0.35 (4934.09) for Ba II. The results were confirmed by measurements of the f_{3933}/f_{4554} (Fig.6) and f_{4078}/f_{4554} (Fig.7) ratios in mixtures of vapours. (Note: the ordinates of Fig.6 and 7 have a misprint: f_{4254} should be f_{4554}.) The results confirmed Saha's ion concentration formula to within

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S/051/61/010/001/002/017
E073/E435

Measurement of the Absolute Oscillator Strengths of the Resonance Lines of Calcium, Strontium and Barium Ions

20% (Table 2). There are 7 figures, 2 tables and 15 references: 12 Soviet and 3 non-Soviet.

SUBMITTED: March 30, 1960

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OSTROVSKIY, Yu. I.; PENKIN, N.P.

Oscillator strengths of the spectral lines of calcium. Opt. i spektr. 10 no.4:429-435 Ap '61. (MIRA 14:3)
(Calcium— Spectra)

OSTROVSKIY, Yu.I.; PENKIN, N.P.

Measurement of the absolute values of oscillator forces in atomic spectra. Part 1. Sodium. Opt.i spektr. 11 no.1:3-11 Jl '61. (MIRA 14:10)

(Spectrum, Atomic) (Sodium)

S/051/61/011/005/001/018
E202/E192

AUTHORS: Ostrovskiy, Yu.I., and Penkin, N.P.

TITLE: Measurement of absolute values of oscillator strengths in atomic spectra.
II. Resonance lines of atoms of group II

PERIODICAL: Optika i spektroskopiya, v.11, no.5, 1961, 565-570

TEXT: Absolute values of oscillator strengths of resonance lines
($^1S_o - {}^1P_1^o$) of calcium ($f_{227} = 1.49 \pm 0.04$), strontium ($f_{4607} = 1.54 \pm 0.05$) and barium ($f_{5535} = 1.40 \pm 0.05$) were measured and found to be in good agreement with the theoretical values and some of the values measured by other authors. The present work was a repetition of an earlier attempt by the present authors and L.N. Shabanova (Ref.1: DAN SSSR, v.120, 66, 1958) in which a photographic-photometric method was employed leading to the evaluation of the total absorption. However, the results of that method were of very low accuracy and for that

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Measurement of absolute values ...

reason in the present work a photoelectric method was used, the details of which were previously described by the present authors (Ref.2: Opt. i spektr. v.11, 1, 1961). The authors used the method of hooks and worked in conditions in which the effect of argon on the broadening of the lines was negligible. Basically the method measured simultaneously the hooks and the total absorption with an accuracy better than 5%. Using the new values for the Ca I, Sr I, and Ba I, the absolute values of f- numbers of the Ca II, Sr II, and Ba II were also found and these results are given in Table 4.
There are 4 figures, 4 tables and 15 references: 10 Soviet-bloc and 5 non-Soviet-bloc. The English language reference reads as follows:
Ref.12: H.M. Russel, C.E. Moor.
J. Res. Nat. Bur. Standards, v.55, 299, 1955.

SUBMITTED: December 28, 1960

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Measurement of absolute values ... S/051/61/011/005/001/018
E202/E192

Table 4

Ion	λ (in Å)	f
Ca II	3933.67	0.84
	3968.47	0.43
Sr II	4077.71	0.76
	4215.52	0.39
Ba II	4554.04	0.66
	4934.09	0.33

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33636

5.5310 1273, 1282, 2209

S/051/62/012/001/001/020
E202/E492

AUTHORS: Penkin, N.P., Shabanova, L.N.

TITLE: Oscillator strengths of spectral lines of magnesium, strontium and barium

PERIODICAL: Optika i spektroskopiya, v.12, no.1, 1962, 3-11

TEXT: Oscillator strengths of 13 lines of principal series of strontium and barium were measured by means of the method of hooks. The hooks in the vicinity of the lines of principal series of SrI and BaI were photographed using an interferometer assembly previously described (Ref.5: D.S.Rozhdestvenskiy, N.P.Penkin, J. Phys. USSR, v.5, 1941, 319). The resulting photographs were interpreted in the usual way used in the method of hooks. It was established that the probabilities of transitions in the principal series of SrI and BaI are changing unevenly with the growth of the principal quantum numbers of the upper levels. Spectra of CaI and SrI had one maximum each, while BaI had three. The actual expression in absolute terms of the f-numbers of the principal series of CaI, SrI and BaI was possible, since the absolute values of oscillator strengths of resonance lines

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S/051/62/012/001/001/020
E202/E492

Oscillator strengths of spectral ...

($^1S_o - {}^1P^o_1$) of the elements of Group II were known. Oscillator strengths of the SrI and BaI lines appearing during simultaneous excitation of two electrons, i.e. transitions $ns^2 - (n-1)dmp$ were measured. The measurements showed that for BaI, the f-numbers change slowly with the change of the principal quantum number m. The authors have also determined the f-numbers of the 14 lines of MgI and 19 lines of SrI, which are present during the transitions:

$$^3P^o_{0,1,2} - {}^3S_1 \text{ and } {}^3P^o_{0,1,2} - {}^3D_{1,2,3}$$

Particular attention was given to a critical comparison of the above f-numbers with those obtained by other authors and by different methods. The general conclusions were as follows: 1) in CaI, SrI and BaI, the f-numbers of the spectral lines appearing in transitions which differ only with respect to the principal quantum number, increase with the increasing atomic number; 2) in the atoms of magnesium, calcium and strontium, there was a good agreement between the experimental and theoretical gf values when the presence of the L - S interaction was assumed; This did not apply to barium. Generally, the

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S/051/62/012/006/001/020
E032/E514

AUTHORS: Ostrovskiy, Yu.I. and Penkin, N.P.

TITLE: On the measurement of the absolute values of the oscillator strengths in atomic spectra. III. Potassium

PERIODICAL: Optika i spektroskopiya, v. 12, no. 6, 1962, 669 - 670

TEXT: The absolute oscillator strength of the resonance KI doublet ($4^2S_{1/2} - 4^2P^o_{1/2,3/2}$. λ7664.907 and 7698.979 Å) has been measured using a somewhat modified form of the apparatus described in previous papers (Ref. 1 - Optika i spektroskopiya, 11, 1961, 3; Ref. 2 - -do- 565) by the authors. In order to prevent deposition of potassium on the windows of the absorption tube the tube with cold windows, which was used before, was replaced by a quartz container whose windows lay inside the heated region. The equivalent width of the absorption line was measured in the second order of a diffraction grating

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(12000 lines/cm), using an ФЭУ-22 (FEU-22) photomultiplier. The large linear dispersion (0.8 Å/mm) which was available meant that wide monochromator exit slits could be employed (0.8 - 1.3 mm). In order to reduce scattered light and prevent the overlap of different diffraction orders, light filters КС-17 (KS-17) and СЗ-4 (SS-4) were placed in front of the monochromator slit. Analysis of the photographs obtained shows that the absolute oscillator strength for the doublet as a whole is 1.03 ± 0.03, which is in good agreement with the results of G. Stephenson (Ref. 5 - Proc, Phys. Soc., A64, 458, 1951).

There are 1 figure and 1 table.

SUBMITTED: April 22, 1961

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